SEQUENCE LISTING

```
<110> Couto, Linda B.
            Colosi, Peter C.
5
      <120> Adeno-Associated Vectors for Expression of Factor VIII
            by Target Cells
      <130> Avigen-04082
10
      <140> xx/xxx,xxx
      <141> 2000-12-18
      <150> 09/470,618
15 <151> 1999-12-22
      <150> 09/364,862
      <151> 1999-07-30
20
      <150> 60/125,974
      <151> 1999-03-24
      <150> 60/104,994
      <151> 1998-10-20
25
      <160> 15
      <170> PatentIn Ver. 2.0
30
      <210> 1
      <211> 59
      <212> DNA
      <213> Artificial Sequence
35
      <220>
      <223> Description of Artificial Sequence: Synthetic
      <400> 1
      cccaagettg eggeegeeg ggtgeegeec etaggeaggt aagtgeegtg tgtggttee 59
40
      <210> 2
      <211> 59
      <212> DNA
      <213> Artificial Sequence
45
      <220>
      <223> Description of Artificial Sequence: Synthetic
```

```
<400> 2
       ccgctcgagc agagctctat ttgcatggtg gaatcgatgc cgcgggaacc acacacggc 59
       <210> 3
 5
       <211> 103
       <212> DNA
       <213> Artificial Sequence
       <220>
10
       <223> Description of Artificial Sequence: Synthetic
       <400> 3
       cccaagettg eggeegeeeg ggtgeegeee ctaggeaggt aagtgeegtg tgtggtteee 60
       gcggcatcga ttccaccatg caaatagagc tctgctcgag cgg
                                                                          103
15
       <210> 4
       <211> 57
       <212> DNA
       <213> Artificial Sequence
20
       <220>
       <223> Description of Artificial Sequence: Synthetic
       <400> 4
25
       ttcccgcggg cctggcctct ttacgggtta tggcccttgc gtgccttgaa ttactga
                                                                          57
       <210> 5
       <211> 57
       <212> DNA
30
      <213> Artificial Sequence
       <220>
       <223> Description of Artificial Sequence: Synthetic
35
      <400> 5
      gaatcgatac ctgtggagaa aaagaaaaag tggatgtcag tgtcagtaat tcaaggc
                                                                         57
      <210> 6
      <211> 99
40
      <212> DNA
      <213> Artificial Sequence
      <223> Description of Artificial Sequence: Synthetic
45
      <400> 6
      ttcccgcggg cctggcctct ttacgggtta tggcccttgc gtgccttgaa ttactgacac 60
      tgacatccac tttttctttt tctccacagg tatcgattc
```

```
<210> 7
       <211> 100
       <212> DNA
       <213> Artificial Sequence
 5
       <223> Description of Artificial Sequence: Synthetic
       <400> 7
10
       agggaatgtt tgttcttaaa taccatccag ggaatgtttg ttcttaaata ccatccaggg 60
       aatgtttgtt cttaaatacc atctacagtt attggttaaa
                                                                         100
       <210> 8
       <211> 59
15
       <212> DNA
       <213> Artificial Sequence
       <220>
       <223> Description of Artificial Sequence: Synthetic
20
       <400> 8
       ggaaaggtga totgtgtgca gaaagactog ototaatata ottotttaac caataactg 59
       <210> 9
25
       <211> 144
       <212> DNA
       <213> Artificial Sequence
      <220>
30
      <223> Description of Artificial Sequence: Synthetic
      <400> 9
      agggaatgtt tgttcttaaa taccatccag ggaatgtttg ttcttaaata ccatccaggg 60
      aatgtttgtt cttaaatacc atctacagtt attggttaaa gaagtatatt agagcgagtc 120
35
      tttctgcaca cagatcacct ttcc
                                                                         144
      <210> 10
      <211> 59
      <212> DNA
40
      <213> Artificial Sequence
      <220>
      <223> Description of Artificial Sequence: Synthetic
45
      tcgagaataa aagatcagag ctctagagat ctgtgtgttg gttttttgtg tgcggccgc 59
      <210> 11
```

```
<211> 59
       <212> DNA
       <213> Artificial Sequence
 5
       <220>
       <223> Description of Artificial Sequence: Synthetic
       <400> 11
       tcgagcggcc gcacacaaaa aaccaacaca cagatctcta gagctctgat cttttattc 59
10
       <210> 12
       <211> 63
       <212> DNA
       <213> Artificial Sequence
15
       <220>
       <223> Description of Artificial Sequence: Synthetic
       <400> 12
20
       tcgagaataa aagatcagag ctctagagat ctgtgtgttg gttttttgtg tgcggccgct 60
       cga
                                                                         63
       <210> 13
       <211> 11933
25
       <212> DNA
      <213> Artificial Sequence
      <220>
      <223> Description of Artificial Sequence: Synthetic
30
      <400> 13
      caqctqcqcq ctcqctcqct cactqaqqcc qcccqqqcaa agcccqqqcq tcqqqcqacc 60
      tttggtcgcc cggcctcagt gagcgagcga gcgcgcagag agggagtggc caactccatc 120
      actaggggtt cctgcggccg cccagggaat gtttgttctt aaataccatc cagggaatgt 180
35
      ttgttcttaa ataccatcca gggaatgttt gttcttaaat accatctaca gttattggtt 240
      aaagaagtat attagagcga gtctttctgc acacagatca cctttccggg tgccgcccct 300
      aggeaggtaa gtgccgtgtg tggttcccgc gggcctggcc tctttacggg ttatggcct 360
      tgcgtgcctt gaattactga cactgacatc cactttttct ttttctccac aggtatcgat 420
      tecaecatge aaatagaget etecaectge ttetttetgt geettttgeg attetgettt 480
40
      agtgccacca gaagatacta cctgggtgca gtggaactgt catgggacta tatgcaaagt 540
      gatctcggtg agctgcctgt ggacgcaaga tttcctccta gagtgccaaa atcttttcca 600
      ttcaacacct cagtcgtgta caaaaagact ctgtttgtag aattcacgga tcaccttttc 660
      aacatcgcta agccaaggcc accctggatg ggtctgctag gtcctaccat ccaggctgag 720
      gtttatgata cagtggtcat tacacttaag aacatggctt cccatcctgt cagtcttcat 780
45
      gctgttggtg tatcctactg gaaagcttct gagggagctg aatatgatga tcagaccagt 840
      caaagggaga aagaagatga taaagtette eetggtggaa geeatacata tgtetggeag 900
      qtcctgaaag agaatggtcc aatggcctct gacccactgt gccttaccta ctcatatctt 960
      tctcatgtgg acctggtaaa agacttgaat tcaggcctca ttggagccct actagtatgt 1020
```

```
agagaaggga gtctggccaa ggaaaagaca cagaccttgc acaaatttat actacttttt 1080
       gctgtatttg atgaagggaa aagttggcac tcagaaacaa agaactcctt gatgcaggat 1140
       agggatgctg catctgctcg ggcctggcct aaaatgcaca cagtcaatgg ttatgtaaac 1200
       aggtetetge caggtetgat tggatgecae aggaaateag tetattggea tgtgattgga 1260
       atgggcacca ctcctgaagt gcactcaata ttcctcgaag gtcacacatt tcttgtgagg 1320
 5
       aaccatcgcc aggcqtcctt ggaaatctcg ccaataactt tccttactgc tcaaacactc 1380
       ttgatggacc ttggacagtt tctactgttt tgtcatatct cttcccacca acatgatggc 1440
       atggaagctt atgtcaaagt agacagctgt ccagaggaac cccaactacg aatgaaaaat 1500
       aatgaagaag cggaagacta tgatgatgat cttactgatt ctgaaatgga tgtggtcagg 1560
10
       tttgatgatg acaactetee tteetttate caaatteget cagttgecaa gaageateet 1620
       aaaacttqqq tacattacat tgctgctgaa gaggaggact gggactatgc tcccttagtc 1680
       ctcgccccg atgacagaag ttataaaagt caatatttga acaatggccc tcagcggatt 1740
       ggtaggaagt acaaaaagt ccgatttatg gcatacacag atgaaacctt taagactcgt 1800
       quaqctattc aqcatqaatc aggaatcttg ggacctttac tttatgggga agttggagac 1860
       acactgttga ttatatttaa gaatcaagca agcagaccat ataacatcta ccctcacgga 1920
15
       atcactgatg tccgtccttt gtattcaagg agattaccaa aaggtgtaaa acatttgaag 1980
       gattttccaa ttctgccagg agaaatattc aaatataaat ggacagtgac tgtagaagat 2040
       gggccaacta aatcagatcc tcggtgcctg acccgctatt actctagttt cgttaatatg 2100
       gagagagate tagetteagg acteattgge ceteteetea tetgetacaa agaatetgta 2160
       gatcaaagag gaaaccagat aatgtcagac aagaggaatg tcatcctgtt ttctgtattt 2220
20
       gatgagaacc gaagctggta cctcacagag aatatacaac gctttctccc caatccagct 2280
       qqaqtqcaqc ttqaqgatcc agagttccaa gcctccaaca tcatgcacag catcaatggc 2340
       tatqtttttq ataqtttqca gttgtcagtt tgtttgcatg aggtggcata ctggtacatt 2400
       ctaagcattg gagcacagac tgactteett tetgtettet tetetggata taeetteaaa 2460
25
       cacaaaatgg totatgaaga cacactcacc ctattcccat totcaggaga aactgtotto 2520
       atqtcqatqq aaaacccagg tctatggatt ctggggtgcc acaactcaga ctttcggaac 2580
       agaggcatga ccgccttact gaaggtttct agttgtgaca agaacactgg tgattattac 2640
       gaggacagtt atgaagatat ttcagcatac ttgctgagta aaaacaatgc cattgaacca 2700
       agaagetteg aaataacteg tactactett cagteagate aagaggaaat tgaetatgat 2760
30
       gataccatat cagttgaaat gaagaaggaa gattttgaca tttatgatga ggatgaaaat 2820
       cagageeece geagetttea aaagaaaaca egacaetatt ttattgetge agtggagagg 2880
       ctctgggatt atgggatgag tagctcccca catgttctaa gaaacagggc tcagagtggc 2940
       agtgtccctc agttcaagaa agttgttttc caggaattta ctgatggctc ctttactcag 3000
       cccttatacc gtggagaact aaatgaacat ttgggactcc tggggccata tataagagca 3060
35
       qaaqttqaaq ataatatcat ggtaactttc agaaatcagg cctctcgtcc ctattccttc 3120
       tattctagcc ttatttctta tgaggaagat cagaggcaag gagcagaacc tagaaaaaac 3180
       tttgtcaagc ctaatgaaac caaaacttac ttttggaaag tgcaacatca tatggcaccc 3240
       actaaagatg agtttgactg caaageetgg gettatttet etgatgttga eetggaaaaa 3300
       gatgtgcact caggcctgat tggacccctt ctggtctgcc acactaacac actgaaccct 3360
40
       gctcatggga gacaagtgac agtacaggaa tttgctctgt ttttcaccat ctttgatgag 3420
       accaaaagct ggtacttcac tgaaaatatg gaaagaaact gcagggctcc ctgcaatatc 3480
       cagatggaag atcccacttt taaagagaat tatcgcttcc atgcaatcaa tggctacata 3540
       atggatacac tacctggctt agtaatggct caggatcaaa ggattcgatg gtatctgctc 3600
       agcatgggca gcaatgaaaa catccattct attcatttca gtggacatgt gttcactgta 3660
       cgaaaaaaag aggagtataa aatggcactg tacaatctct atccaggtgt ttttgagaca 3720
45
       gtggaaatgt taccatccaa agctggaatt tggcgggtgg aatgccttat tggcgagcat 3780
       ctacatgctg ggatgagcac actttttctg gtgtacagca ataagtgtca gactcccctg 3840
       ggaatggctt ctggacacat tagagatttt cagattacag cttcaggaca atatggacag 3900
```

```
tgggccccaa agctggccag acttcattat tccggatcaa tcaatgcctg gagcaccaag 3960
       gagccctttt cttggatcaa ggtggatctg ttggcaccaa tgattattca cggcatcaag 4020
       acccagggtq cccqtcaqaa gttctccagc ctctacatct ctcagtttat catcatgtat 4080
       aqtcttgatg ggaagaagtg gcagacttat cgaggaaatt ccactggaac cttaatggtc 4140
 5
       ttctttqqca atqtqqattc atctqqqata aaacacaata tttttaaccc tccaattatt 4200
       gctcgataca tccgtttgca cccaactcat tatagcattc gcagcactct tcgcatggag 4260
       ttgatgggct gtgatttaaa tagttgcagc atgccattgg gaatggagag taaagcaata 4320
       tcagatgcac agattactgc ttcatcctac tttaccaata tgtttgccac ctggtctcct 4380
       tcaaaaqctc qacttcacct ccaagggagg agtaatgcct ggagacctca ggtgaataat 4440
10
       ccaaaagagt ggctgcaagt ggacttccag aagacaatga aagtcacagg agtaactact 4500
       cagggagtaa aatctctgct taccagcatg tatgtgaagg agttcctcat ctccagcagt 4560
       caaqatqqcc atcaqtqqac tctcttttt cagaatqqca aaqtaaaqgt ttttcaqqqa 4620
       aatcaagact cettcacace tgtggtgaac tetetagace cacegttact gactegetac 4680
       cttcgaattc acccccagag ttgggtgcac cagattgccc tgaggatgga ggttctgggc 4740
15
       tgcqaggcac aggacctcta ctgactcgag aataaaagat cagagctcta gagatctgtg 4800
       tgttggtttt ttgtgtgcgg ccgcaggaac ccctagtgat ggagttggcc actccctctc 4860
       tgcgcgctcg ctcgctcact gaggccgggc gaccaaaggt cgcccgacgc ccgggctttg 4920
       cccgggcggc ctcagtgagc gagcgagcgc gcagctgcct gcaggacatg tgagcaaaag 4980
       qccaqcaaaa ggccaggaac cgtaaaaagg ccgcgttgct ggcgtttttc cataggctcc 5040
20
      qccccctqa cqaqcatcac aaaaatcgac gctcaagtca gaggtggcga aacccgacag 5100
      qactataaaq ataccaggcg tttccccctg gaagctccct cgtgcgctct cctgttccga 5160
      ccctqccqct taccggatac ctgtccgcct ttctcccttc gggaagcgtg gcgctttctc 5220
      atageteacg etgtaggtat eteagttegg tgtaggtegt tegeteeaag etgggetgtg 5280
       tgcacgaacc ccccgttcag cccgaccgct gcgccttatc cggtaactat cgtcttgagt 5340
25
      ccaacccqqt aagacacqac ttatcqccac tqqcaqcaqc cactqqtaac aggattaqca 5400
      qaqcqaqqta tqtaqqcqqt qctacaqaqt tcttqaaqtq gtggcctaac tacggctaca 5460
      ctaqaaqqac agtatttggt atctgcgctc tgctgaagcc agttaccttc ggaaaaagag 5520
      ttqqtaqctc ttqatccggc aaacaaacca ccgctggtag cggtggtttt tttgtttgca 5580
      agcagcagat tacgcgcaga aaaaaaggat ctcaagaaga tcctttgatc ttttctacgg 5640
30
      ggtctgacgc tcagtggaac gaaaactcac gttaagggat tttggtcatg agattatcaa 5700
       aaaggatett cacetagate ettttaaatt aaaaatgaag ttttaaatea atetaaagta 5760
      tatatgagta aacttggtct gacagttacc aatgcttaat cagtgaggca cctatctcag 5820
      cqatctqtct atttcqttca tccatagttg cctgactccc cgtcgtgtag ataactacga 5880
      tacgggaggg cttaccatct ggccccagtg ctgcaatgat accgcgagac ccacgctcac 5940
35
      cggctccaga tttatcagca ataaaccagc cagccggaag ggccgagcgc agaagtggtc 6000
      ctgcaacttt atccgcctcc atccagtcta ttaattgttg ccgggaagct agagtaagta 6060
      gttcgccagt taatagtttg cgcaacgttg ttgccattgc tacaggcatc gtggtgtcac 6120
      gctcgtcgtt tggtatggct tcattcagct ccggttccca acgatcaagg cgagttacat 6180
      gatcccccat gttgtgcaaa aaagcggtta gctccttcgg tcctccgatc gttgtcagaa 6240
      gtaagttggc cgcagtgtta tcactcatgg ttatggcagc actgcataat tctcttactg 6300
40
      tcatgccatc cgtaagatgc ttttctgtga ctggtgagta ctcaaccaag tcattctgag 6360
      aataqtqtat gcqqcqaccq agttqctctt gcccggcqtc aatacgggat aataccgcgc 6420
      cacatagcag aactttaaaa gtgctcatca ttggaaaacg ttcttcgggg cgaaaactct 6480
      caaggatett accgetgttg agatecagtt egatgtaace caetegtgea eccaactgat 6540
      cttcagcatc ttttactttc accagcgttt ctgggtgagc aaaaacagga aggcaaaatg 6600
45
      ccgcaaaaaa gggaataagg gcgacacgga aatgttgaat actcatactc ttcctttttc 6660
      aatattattg aagcatttat cagggttatt gtctcatgag cggatacata tttgaatgta 6720
      tttaqaaaaa taaacaaata ggggttccgc gcacatttcc ccgaaaagtg ccacctgacg 6780
```

```
tctaagaaac cattattatc atgacattaa cctataaaaa taggcgtatc acgaggccct 6840
       ttcgtctcgc gcgtttcggt gatgacggtg aaaacctctg acacatgcag ctcccggaga 6900
       cggtcacagc ttgtctgtaa gcggatgccg ggagcagaca agcccgtcag ggcgcgtcag 6960
       cgggtgttgg cgggtgtcgg ggctggctta actatgcggc atcagagcag attgtactga 7020
       gagtgcacca taaaattgta aacgttaata ttttgttaaa attcgcgtta aatttttgtt 7080
 5
       agatcagete attittaac caataggeeg aaateggeaa aateeettat aaateaaaag 7140
       aatagcccga gatagggttg agtgttgttc cagtttggaa caagagtcca ctattaaaga 7200
       acgtggactc caacgtcaaa gggcgaaaaa ccgtctatca gggcgatggc ccactacgtg 7260
       aaccatcacc caaatcaagt tttttggggt cgaggtgccg taaagcacta aatcggaacc 7320
10
       ctaaaqqqaq cccccqattt agaqcttgac ggggaaagcc ggcgaacgtg gcgagaaagg 7380
       aagggaagaa agcgaaagga gcgggcgcta gggcgctggc aagtgtagcg gtcacgctgc 7440
       qcqtaaccac cacaccqcc qcqcttaatq cqccqctaca gggcqcqtac tatggttqct 7500
       ttgacgtatg cggtgtgaaa taccgcacag atgcgtaagg agaaaatacc gcatcaggcc 7560
       qtaacctqtc ggatcaccgg aaaggacccg taaagtgata atgattatca tctacatatc 7620
15
       acaacgtgcg tggaggccat caaaccacgt caaataatca attatgacgc aggtatcgta 7680
       ttaattgatc tgcatcaact taacgtaaaa acaacttcag acaatacaaa tcagcgacac 7740
       tqaatacqgg gcaacctcat gtcaacgaag aacagaaccc gcagaacaac aacccgcaac 7800
       atccqctttc ctaaccaaat gattgaacaa attaacatcg ctcttgagca aaaagggtcc 7860
       gggaatttet cageetgggt cattgaagee tgeegtegga gaetaaegte agaaaagaga 7920
20
       gcatatacat caattaaaag tgatgaagaa tgaacatccc gcgttcttcc ctccgaacag 7980
       gacgatattg taaattcact taattacgag ggcattgcag taattgagtt gcagttttac 8040
       cactttcctg acagtgacag actgcgtgtt ggctctgtca cagactaaat agtttgaatg 8100
       attagcagtt atggtgatca gtcaaccacc agggaataat cettcatatt attategtge 8160
       ttcaccaacg ctqcctcaat tgctctgaat gcttccagag acaccttatg ttctatacat 8220
       gcaattacaa catcagggta actcatagaa atggtgctat taagcatatt ttttacacga 8280
25
       atcagatcca cggagggatc atcagcagat tgttctttat tcattttgtc gctccatgcg 8340
       cttqctcttc atctagcggt taaaatatta cttcaaatct ttctgtatga agatttgagc 8400
       acqttggcct tacatacatc tgtcggttgt atttccctcc agaatgccag caggaccgca 8460
       ctttgttacg caaccaatac tattaagtga aaacattcct aatatttgac ataaatcatc 8520
30
       aacaaaacac aaggaggtca gaccagattg aaacgataaa aacgataatg caaactacgc 8580
       gccctcgtat cacatggaag gttttaccaa tggctcaggt tgccattttt aaagaaatat 8640
       tcgatcaagt gcgaaaagat ttagactgtg aattgtttta ttctgaacta aaacgtcaca 8700
       acqtctcaca ttatatttac tatctagcca cagataatat tcacatcgtg ttagaaaacg 8760
       ataacaccgt gttaataaaa ggacttaaaa aggttgtaaa tgttaaattc tcaagaaaca 8820
35
       cgcatcttat agaaacgtcc tatgataggt tgaaatcaag agaaatcaca tttcagcaat 8880
       acagggaaaa tettgetaaa geaggagttt teegatgggt tacaaatate catgaacata 8940
       aaagatatta ctataccttt gataattcat tactatttac tgagagcatt cagaacacta 9000
       cacaaatett tecaegetaa ateataaegt eeggtttett eegtgteage aeeggggegt 9060
       tggcataatg caatacgtgt acgcgctaaa ccctgtgtgc atcgttttaa ttattcccgg 9120
       acactcccgc agagaagttc cccgtcaggg ctgtggacat agttaatccg ggaatacaat 9180
40
       gacgattcat cgcacctgac atacattaat aaatattaac aatatgaaat ttcaactcat 9240
       tgtttagggt ttgtttaatt ttctacacat acgattctgc gaacttcaaa aagcatcggg 9300
       aataacacca tgaaaaaaat gctactcgct actgcgctgg ccctgcttat tacaggatgt 9360
       gctcaacaga cgtttactgt tcaaaacaaa ccggcagcag tagcaccaaa ggaaaccatc 9420
45
      acccatcatt tettegttte tggaattggg cagaagaaaa etgtegatge agccaaaatt 9480
       tgtggcggcg cagaaaatgt tgttaaaaca gaaacccagc aaacattcgt aaatggattg 9540
       ctcggtttta ttactttagg catttatact ccgctggaag cgcgtgtgta ttgctcacaa 9600
       taattgcatg agttgcccat cgcgatatgg gcaactctat ctgcactgct cattaatata 9660
```

```
cttctqqqtt ccttccagtt gtttttgcat agtgatcagc ctctctctga gggtgaaata 9720
       atcccqttca gcqqtgtctg ccagtcgggg ggaggctgca ttatccacgc cggaggcggt 9780
       ggtggcttca cgcactgact gacagactgc tttgatgtgc aaccgacgac gaccagcggc 9840
       aacatcatca eqeaqaqeat catttteage tttageatca getaacteet tegtgtattt 9900
 5
       tgcatcgage geageaacat caegetgaeg catetgeatg teagtaattg cegegttege 9960
       cagetteagt tetetggeat ttttgtegeg etgggetttg taggtaatgg egttateaeg 10020
       qtaatqatta acagcccatg acaggcagac gatgatgcag ataaccagag cggagataat 10080
       eggggtgact etgeteatac atcaatetet etgacegtte egecegette tttgaatttt 10140
       qcaatcaqqc tqtcaqcctt atgctcgaac tgaccataac cagcgcccgg cagtgaagcc 10200
10
       cagatattgc tgcaacggtc gattgcctga cggatatcac cacgatcaat cataggtaaa 10260
       qcqccacqct ccttaatctg ctgcaatgcc acagcgtcct gacttttcgg agagaagtct 10320
       ttcaggccaa gctgcttgcg gtaggcatcc caccaacggg aaagaagctg gtagcgtccg 10380
       qcqcctqttq atttgagttt tgggtttagc gtgacaagtt tgcgagggtg atcggagtaa 10440
       tcagtaaata gctctccgcc tacaatgacg tcataaccat gatttctggt tttctgacgt 10500
15
       ccgttatcag ttccctccga ccacgccagc atatcgagga acgccttacg ttgattattg 10560
       atttctacca tcttctactc cggctttttt agcagcgaag cgtttgataa gcgaaccaat 10620
       cgagtcagta ccgatgtagc cgataaacac gctcgttata taagcgagat tgctacttag 10680
       teeggegaag tegagaaggt caegaatgaa eeaggegata atggegeaca tegttgegte 10740
      qattactgtt tttgtaaacg caccgccatt atatctgccg cgaaggtacg ccattgcaaa 10800
20
      cqcaaqqatt qccccqatgc cttgttcctt tgccgcgaga atggcggcca acaggtcatg 10860
      tttttctggc atcttcatgt cttaccccca ataaggggat ttgctctatt taattaggaa 10920
      taaqqtcqat tactgataga acaaatccag gctactgtgt ttagtaatca gatttgttcg 10980
       tgaccgatat gcacgggcaa aacggcagga ggttgttagc gcgacctcct gccacccgct 11040.
      ttcacgaagg tcatgtgtaa aaggccgcag cgtaactatt actaatgaat tcaggacaga 11100
25
      caqtqqctac qqctcaqttt gggttgtgct gttgctgggc ggcgatgacg cctgtacgca 11160
      tttqqtqatc cqgttctgct tccggtattc gcttaattca gcacaacgga aagagcactg 11220
      gctaaccagg ctcgccgact cttcacgatt atcgactcaa tgctcttacc tgttgtgcag 11280
      atataaaaaa toocgaaaco qttatqoagg ototaactat tacotgogaa ctgtttoggg 11340
      attqcatttt qcagacctct ctgcctgcga tggttggagt tccagacgat acgtcgaagt 11400
30
      qaccaactaq qcqqaatcqq tagtaagcqc cqcctctttt catctcacta ccacaacgag 11460
      cgaattaacc catcgttgag tcaaatttac ccaattttat tcaataagtc aatatcatgc 11520
      cgttaatatg ttgccatccg tggcaatcat gctgctaacg tgtgaccgca ttcaaaatgt 11580
      tgtctgcgat tgactcttct ttgtggcatt gcaccaccag agcgtcatac agcggcttaa 11640
      cagtgcgtga ccaggtgggt tgggtaaggt ttgggattag catcgtcaca gcgcgatatg 11700
      ctgcgcttgc tggcatcctt gaatagccga cgcctttgca tcttccgcac tctttctcga 11760
35
      caactctccc ccacaqctct qttttqqcaa tatcaaccgc acggcctgta ccatggcaat 11820
      ctctqcatct tqccccqqc qtcqcqqcac tacqqcaata atccqcataa gcgaatgttg 11880
      cgagcacttg cagtaccttt gccttagtat ttccttcaag ctgcccctgc agg
40
      <210> 14
      <211> 4999
      <212> DNA
      <213> Artificial Sequence
45
      <223> Description of Artificial Sequence: Synthetic
      <400> 14
```

```
egecectgea ggeagetgeg egetegeteg etcaetgagg eegeceggge aaageeeggg 60
       cqtcqqqcqa cctttggtcg cccggcctca gtgagcgagc gagcgcgcag agagggagtg 120
       gccaactcca tcactagggg ttcctgcggc cgcacgcgtg gtggcgcggg gtaaactggg 180
       aaagtgatgt cgtgtactgg ctccgccttt ttcccgaggg tggggggagaa ccgtatataa 240
 5
       gtgcagtagt cgccgtgaac gttctttttc gcaacgggtt tgccgccccg cggcaggtaa 300
       gtgccaggga atgtttgttc ttaaatacca tcgctccagg gaatgtttgt tcttaaatac 360
       catctactga cactgacatc cactttttct ttttctccac aggtatcgat ccaccatgca 420
       aatagagete tecacetget tetttetgtg cettttgega ttetgettta gtgccaceag 480
       aagatactac ctgggtgcag tggaactgtc atgggactat atgcaaagtg atctcggtga 540
       gctgcctgtg gacgcaagat ttcctcctag agtgccaaaa tcttttccat tcaacacctc 600
10
       aqtcqtqtac aaaaaqactc tgtttgtaga attcacggat caccttttca acatcgctaa 660
       gccaaggcca ccctggatgg gtctgctagg tcctaccatc caggctgagg tttatgatac 720
       agtggtcatt acacttaaga acatggcttc ccatcctgtc agtcttcatg ctgttggtgt 780
       atcctactgg aaagcttctg agggagctga atatgatgat cagaccagtc aaagggagaa 840
       agaagatgat aaagtcttcc ctggtggaag ccatacatat gtctggcagg tcctgaaaga 900
15
       gaatggtcca atggcctctg acccactgtg ccttacctac tcatatcttt ctcatgtgga 960
       cctqqtaaaa gacttgaatt caggcctcat tggagcccta ctagtatgta gagaagggag 1020
       tctggccaag gaaaagacac agaccttgca caaatttata ctactttttg ctgtatttga 1080
       tqaaqqqaaa aqttqqcact cagaaacaaa gaactccttg atgcaggata gggatgctgc 1140
       atctgctcgg gcctggccta aaatgcacac agtcaatggt tatgtaaaca ggtctctgcc 1200
20
       aggtctgatt ggatgccaca ggaaatcagt ctattggcat gtgattggaa tgggcaccac 1260
       tectgaagtg caeteaatat teetegaagg teacacattt ettgtgagga accategeca 1320
       ggcgtccttg gaaatctcgc caataacttt ccttactgct caaacactct tgatggacct 1380
       tggacagttt ctactgtttt gtcatatctc ttcccaccaa catgatggca tggaagctta 1440
       tgtcaaagta gacagctgtc cagaggaacc ccaactacga atgaaaaata atgaagaagc 1500
25
      ggaagactat gatgatgatc ttactgattc tgaaatggat gtggtcaggt ttgatgatga 1560
       caactctcct tcctttatcc aaattcgctc agttgccaag aagcatccta aaacttgggt 1620
      acattacatt gctgctgaag aggaggactg ggactatgct cccttagtcc tcgcccccga 1680
      tgacagaagt tataaaagtc aatatttgaa caatggccct cagcggattg gtaggaagta 1740
      caaaaaagtc cgatttatgg catacacaga tgaaaccttt aagactcgtg aagctattca 1800
30
      gcatgaatca ggaatcttgg gacctttact ttatggggaa gttggagaca cactgttgat 1860
      tatatttaag aatcaagcaa gcagaccata taacatctac cctcacggaa tcactgatgt 1920
      ccqtcctttq tattcaaqqa qattaccaaa aggtqtaaaa catttgaagg attttccaat 1980
       tctqccaqqa gaaatattca aatataaatg gacagtgact gtagaagatg ggccaactaa 2040
35
      atcagatect eggtgeetga ecceptatta etetagttte gttaatatgg agagagatet 2100
      agcttcagga ctcattggcc ctctcctcat ctgctacaaa gaatctgtag atcaaagagg 2160
      aaaccagata atgtcagaca agaggaatgt catcctgttt tctgtatttg atgagaaccg 2220
      aagctggtac ctcacagaga atatacaacg ctttctcccc aatccagctg gagtgcagct 2280
      tqaqqatcca qaqttccaag cctccaacat catgcacagc atcaatggct atgtttttga 2340
40
      tagtttqcag ttqtcagttt gtttgcatga ggtggcatac tggtacattc taagcattgg 2400
      agcacagact gacttccttt ctgtcttctt ctctggatat accttcaaac acaaaatggt 2460
      ctatgaagac acactcaccc tattcccatt ctcaggagaa actgtcttca tgtcgatgga 2520
      aaacccaggt ctatggattc tggggtgcca caactcagac tttcggaaca gaggcatgac 2580
      egeettaetg aaggttteta gttgtgacaa gaacaetggt gattattaeg aggacagtta 2640
      tgaagatatt tcagcatact tgctgagtaa aaacaatgcc attgaaccaa gaagcttctc 2700
45
      ccagaatcca ccagtcttga aacgccatca acgcgaaata actcgtacta ctcttcagtc 2760
      agatcaagag gaaattgact atgatgatac catatcagtt gaaatgaaga aggaagattt 2820
      tgacatttat gatgaggatg aaaatcagag cccccgcagc tttcaaaaga aaacacgaca 2880
```

```
ctattttatt gctgcagtgg agaggctctg ggattatggg atgagtagct ccccacatgt 2940
       tctaaqaaac aqqqctcaqa qtqqcaqtqt ccctcaqttc aaqaaaqttq ttttccaqqa 3000
       atttactgat ggctccttta ctcagccctt ataccgtgga gaactaaatg aacatttggg 3060
       actcctgggg ccatatataa gagcagaaqt tgaagataat atcatggtaa ctttcagaaa 3120
 5
       traggertet egteretatt cettetatte tageettatt tettatgagg aagateagag 3180
       gcaaggagca gaacctagaa aaaactttgt caagcctaat gaaaccaaaa cttacttttg 3240
       qaaaqtqcaa catcatatqq cacccactaa aqatqaqttt qactqcaaaq cctqqqctta 3300
       tttctctgat gttgacctgg aaaaagatgt gcactcaggc ctgattggac cccttctggt 3360
       ctgccacact aacacactga accetgetea tgggagacaa gtgacagtac aggaatttgc 3420
10
       tetgttttte accatetttg atgagaecaa aagetggtae tteaetgaaa atatggaaag 3480
       aaactgcagg gctccctgca atatccagat ggaagatccc acttttaaag agaattatcg 3540
       cttccatgca atcaatggct acataatgga tacactacct ggcttagtaa tggctcagga 3600
       tcaaaggatt cgatggtatc tgctcagcat gggcagcaat gaaaacatcc attctattca 3660
       tttcagtgga catgtgttca ctgtacgaaa aaaagaggag tataaaatgg cactgtacaa 3720
15
       tetetateca ggtgtttttg agacagtgga aatgttacca tecaaagetg gaatttggeg 3780
       ggtggaatgc cttattggcg agcatctaca tgctgggatg agcacacttt ttctggtgta 3840
       cagcaataag tgtcagactc ccctgggaat ggcttctgga cacattagag attttcagat 3900
       tacagettea ggacaatatg gacagtggge eccaaagetg gecagaette attatteegg 3960
       atcaatcaat gcctggagca ccaaggagcc cttttcttgg atcaaggtgg atctgttggc 4020
20
       accaatgatt attcacggca tcaagaccca gggtgcccgt cagaagttct ccagcctcta 4080
       catctctcag tttatcatca tgtatagtct tgatgggaag aagtggcaga cttatcqagg 4140
       aaattccact ggaaccttaa tggtcttctt tggcaatgtg gattcatctg ggataaaaca 4200
       caatattttt aaccctccaa ttattgctcg atacatccgt ttgcacccaa ctcattatag 4260
       cattegeage actettegea tggagttgat gggctgtgat ttaaatagtt geageatgee 4320
25
       attgggaatg gagagtaaag caatatcaga tgcacagatt actgcttcat cctactttac 4380
       caatatgttt gccacctggt ctccttcaaa agctcgactt cacctccaag ggaggagtaa 4440
       tgcctggaga cctcaggtga ataatccaaa agagtggctg caagtggact tccagaagac 4500
       aatgaaagtc acaggagtaa ctactcaggg agtaaaatct ctgcttacca gcatgtatgt 4560
       qaaggagttc ctcatctcca gcagtcaaga tggccatcag tggactctct tttttcagaa 4620
30
       tggcaaagta aaggtttttc agggaaatca agactccttc acacctgtgg tgaactctct 4680
       agacccaccg ttactgactc gctaccttcg aattcacccc cagagttggg tgcaccagat 4740
       tgccctgagg atggaggttc tgggctgcga ggcacaggac ctctactgac tcgagcctaa 4800
       taaaggaaat ttattttcat tgcaatagtg tgttggtttt ttgtgtgcgg ccgcaggaac 4860
       ccctagtgat ggagttggcc actccctctc tgcgcgctcg ctcgctcact gaggccgggc 4920
       gaccaaaggt cgcccgacgc ccgggctttg cccgggcggc ctcagtgagc gagcgagcgc 4980
35
       gcagctgcct gcaggacat
                                                                         4999
       <210> 15
       <211> 14
40
       <212> PRT
       <213> Artificial Sequence
      <220>
      <223> Description of Artificial Sequence: Synthetic
45
      Ser Phe Ser Gln Asn Pro Pro Val Leu Lys Arg His Gln Arg
        1
                         5
                                            10
```